PATENT SPECIFICATION

Application Date: July 4, 1927. No. 17,758/27. **288,862**

Complete Left: Feb. 9, 1928.

Complete Accepted: April 19, 1928.

PROVISIONAL SPECIFICATION.

Improvements in, and relating to, the Pneumatic Conveyance of Coal and other Materials.

We, DORMAN, LONG AND COMPANY, LIMITED, of 7, Zetland Road, Middlesbrough, in the County of York, a company incorporated under the laws of Great Britain and Ireland, and MATTHEW ROBSON KIRBY, of 59, Old Elvet, in the City of Durham, a British subject, do hereby declare the nature of this invention to be as follows:—

Our invention relates to the pneumatic conveyance of coal and other materials, but as the invention has been specially devised for dealing with coal, only coal will be referred to.

Usually, coal pneumatically conveyed from the working place is delivered into a receptacle whence it is mechanically transported to the surface. The major part of the coal dust separated from the bulk coal is collected in filters or the like whence it is likewise mechanically transported to the surface. A certain amount of dust, mainly the finest, however, escapes the filters, and it is with the object of dealing with this free dust in order to render it innocuous, that we have primarily devised our present invention.

To this end, the invention comprises a process, and apparatus for carrying the process into practice.

The process is distinguished in that the free dust is collected, quenched and collected in a condition of slurry which may be removed periodically and subjected to any desired treatment.

The apparatus is characterised by the incorporation in the conveying system of means for collecting the dust, quenching it, and transferring the product as slurry to another collector or collectors whence it is removed as required. Appropriately, the collecting and quenching means may comprise a water ejector or ejectors which may be substituted for the customary mechanical pumps included in the conveying system, or may be adapted to be complemental thereto.

By way of example, we will now describe one embodiment of the invention wherein the customary mechanical pump is replaced by the water ejector.

We construct and arrange the collectors for the bulk coal and for the major portion of the dust as usual, and like wise interpose them in the pipe line of the conveying system. Following the main dust collectors or filters, we interpose in the pipe line a water ejector, the water being supplied by a suitably-driven centrifugal pump which draws the water from a storage tank which derives its supply from any suitable source. The ejector is connected by pipes to one or more collectors constituting a settling tank or tanks for the quenched dust or slurry, which tank or tanks, in turn, is or are connected by pipes to the water storage tank. By adopting at least a pair of settling tanks, one can be used for receiving the quenched dust or slurry while the other is being emptied.

Briefly, the operation is as follows:

Assuming the water storage tank filled and the pump in operation, then the pump feeds the ejector with water which operates to draw the coal from the coal face, whereupon the bulk coal enters its collector and the major portion of the dust passes and settles in its collectors or filters, while the remaining or free dust is drawn into the ejector where it is drenched with water and thus made into a slurry which, with the surplus water, is discharged into the settling tanks, the water overflowing or being otherwise directed from these tanks into the water storage tank for re-use together with replenishing water. When required, the slurry is removed from the settling tanks and dried for use as fuel.

Dated this 4th day of July, 1927.

MEWBURN, ELLIS & Co.,
70—72, Chancery Lane, London, W.C. 2,
Chartered Patent Agents.

[Price 1/-]

COMPLETE SPECIFICATION.

Improvements in, and relating to, the Pneumatic Conveyance of Coal and other Materials.

We, DORMAN, LONG AND COMPANY, LIMITED, of 7, Zetland Road, Middlesbrough, in the County of York, a company incorporated under the laws of Great Britain and Ireland, and MATTHEW ROBSON KIRBY, of 59, Old Elvet, in the City of Durham, a British subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Our invention relates to the pneumatic conveyance of coal and other materials, but as the invention has been specially devised for dealing with coal, only coal will be referred to.

Usually, coal pneumatically conveyed from the working place is delivered into a receptacle whence it is mechanically transported to the surface. The major part of the coal dust separated from the bulk coal is collected in filters or the like whence it is likewise mechanically transported to the surface. A certain amount of dust, mainly the finest, however, escapes the filters, and it is with the object of dealing with this free dust in order to render it innocuous, that we have primarily devised our present invention.

To this end, the invention comprises a process, and apparatus for carrying the process into practice.

The process is distinguished in that the free dust is collected, quenched and collected in a condition of slurry which may be removed periodically and subjected to any desired treatment.

The apparatus is characterised by the incorporation in the conveying system of means for collecting the dust, quenching it, and transferring the product as slurry to another collector or collectors whence it is removed as required. Appropriately, the collecting and quenching means may comprise a water ejector or ejectors which may be substituted for the customary mechanical pumps included in the conveying system, or may be adapted to be complemental thereto.

By way of example, we will now describe one embodiment of the invention wherein the customary mechanical pump is replaced by the water ejector, and in doing so, we will refer to the accompanying drawing which shows in plan the general arrangement of the apparatus and part of the workings of the mine.

a is a main road in the workings, *b* is a heading from which coal is being won, and *c c* are recesses, cuttings, or chambers, in which the various components of the apparatus are disposed. We construct and arrange the collector *d* for the bulk coal and the collectors *e e* for the major portion of the dust as usual, and likewise interpose them in the pipe line of the conveying system so that the pipe *f*, which has a nozzle *g* at one end disposed in the heading *b*, is connected at its other end to the bulk coal collector *d*. A pipe *h* connects the bulk coal collector *d* to the main dust collectors *e e*. Following the main dust collectors or filters *e e*, we interpose in the pipe line a water ejector *i* of any known and suitable type, a pipe *j* providing communication between the main dust collectors *e e* and the ejector *i*. Water is supplied to the ejector *i* through a pipe *k* by a suitably driven centrifugal pump *l* which draws the water through a pipe *m* from a storage tank *n*; the latter derives its supply from any suitable source by way of a pipe *o*. The ejector *i* is connected by a pipe *p* having valve controlled branches *q q* to a pair of collectors *r r* constituting settling tanks for the quenched dust or slurry, which tanks, in turn, are connected by pipes *s s* to the water storage tank *n*. There may be only one tank *r*, or a plurality thereof, but by adopting at least a pair of such tanks, one can be used for receiving the quenched dust or slurry, while the other is being emptied, the valves in the branch pipes *q q* being operated to this end.

Briefly the operation is as follows:—

Assuming the water storage tank *n* is filled, and the pump *l* is in operation, then the pump *l* feeds the ejector *i* with water and the consequent suction set up in the pipe line *j*, *h*, *f* operates to draw the coal from the coal face, whereupon the bulk coal enters its collector *d* and the major portion of the coal dust passes on and settles in its collectors or filters *e e*. The remaining or free dust is drawn into the ejector *i* where it is drenched with water and thus made into a slurry which, with the surplus water, is discharged into the settling tanks *r*, *r*, the water overflowing or being otherwise directed from these tanks by way of the pipes *s*, *s* into the water storage tank *n* for re-use together with replenishing water. When

required, the slurry is removed from the settling tanks *r r* and dried for use as fuel.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A process for pneumatic conveyance of coal and other materials consisting in that free dust of the material is collected and quenched with fluid and then collected, quenched or in a condition of slurry, substantially as described.

2. A process according to Claim 1 in which the fluid employed is water.

3. A process according to Claim 1 or 2 in which the free dust and/or slurry are collected by suction.

4. A process according to Claim 1, 2 or 3 in which the slurry is discharged into settling tanks.

5. Apparatus for the pneumatic conveyance of coal and other materials comprising means for collecting the dust, quenching it, and transferring the product as slurry to another collector or collectors whence it is removed as required. substantially as described.

6. Apparatus according to Claim 5 comprising a water ejector or ejectors for effecting the quenching of the free dust.

7. Apparatus according to Claim 5 comprising a water ejector or ejectors for effecting the suction.

8. Apparatus according to Claim 6 or 7 further comprising mechanical pumps complementary to the ejector or ejectors.

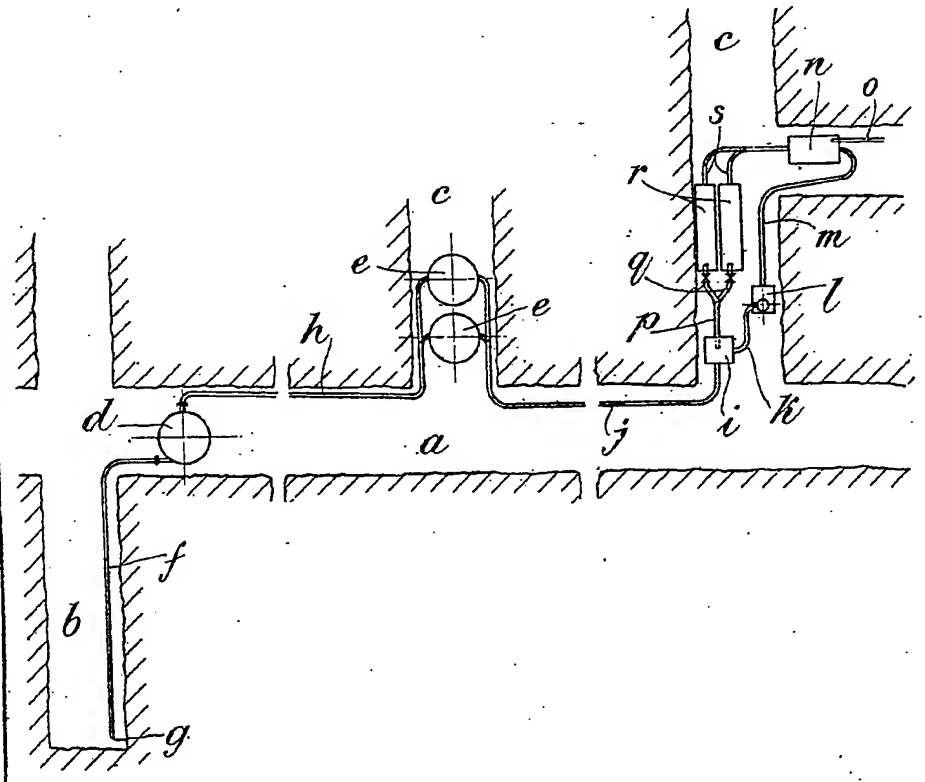
9. Apparatus according to Claim 8 further comprising collectors for the bulk material and for the dust interposed in the pipe line of the conveying system and settling tanks for the quenched dust.

10. A process for the pneumatic conveyance of coal substantially as described and illustrated with reference to the accompanying drawings.

11. Apparatus for the pneumatic conveyance of coal and other materials substantially as described and illustrated with reference to the accompanying drawings.

Dated this 9th day of February, 1928.

MEWBURN, ELLIS & Co.,
70—72, Chancery Lane, London, W.C. 2,
Chartered Patent Agents.



[This Drawing is a reproduction of the Original on a reduced scale.]

Charles & Read Ltd. Photo Litho.

AN - 1998-058758 [06]

TI - Deodorising apparatus for refuse pneumatic conveyor in buildings - has blower which supplies deodourising agent into air duct using fluctuation of suction pressure, during refuse transportation

AB - J09301504 The apparatus includes a blower (6) which supplies deodourising agent into an air duct (7a) using the fluctuations in suction pressure, at the time of refuse transportation. A deodourising agent charging size is connected at the end of the air duct. The rear end of the piping is connected to a container (12) accommodating the deodourising agent and comprising an external opening (12a).

ADVANTAGE - Saves deodour agent, reliably. Reduces occupancy area considerably. Removes bad smell efficiently.

- (Dwg.1/7)
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IW - DEODORISE APPARATUS REFUSE PNEUMATIC CONVEYOR BUILD BLOW SUPPLY AGENT AIR DUCT FLUCTUATION SUCTION PRESSURE REFUSE TRANSPORT

PN - JP3154226B2 B2 20010409 DW200122 B65F5/00 008pp
- JP9301504 A 19971125 DW199806 B65F5/00 008pp
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IC - B01D53/38 ;B65F5/00 ;B65F7/00 ;B65G53/24

MC - D09-B J01-G03

DC - D22 J01 Q35

PA - (NIKN) NIPPON KOKAN KOJI KK
- (NIKN) NKK CORP
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AP - JP19960122876 19960517; [Previous Publ. JP9301504]
;JP19960122876 19960517

PR - JP19960122876 19960517

AN - 1998-316523 [28]

TI - Jamming prevention structure for pneumatic conveyor - has ejector unit operated using control unit to convey particles in conveyance path freely by compensating pressure difference between entrance and exit that is negligible compared to set value

AB - J10114430 The structure includes a pressure detector (34) which detects the static pressure of particles in the conveying path at the entrance or at the exit. The differential pressure between the entrance and exit of the conveyance path is also detected.

- A compressor and a blower arrangement are provided to compensate the pressure difference by applying high pressure at the exit or at the entrance of the conveyance path. If the pressure difference is very small compared to a set value, an ejector unit (35) operated using a control unit (39) compensates the pressure difference for conveying the particle freely.

- ADVANTAGE - Enables stabilised pneumatic transportation. Prevents jamming of particles in flow path, reliably.

- (Dwg.1/2)

IW - JAMMING PREVENT STRUCTURE PNEUMATIC CONVEYOR EJECT UNIT OPERATE CONTROL UNIT CONVEY PARTICLE CONVEY PATH FREE COMPENSATE PRESSURE DIFFER ENTER EXIT NEGLIGIBLE COMPARE SET VALUE

PN - JP10114430 A 19980506 DW199828 B65G53/66 005pp

IC - B04C9/00 ;B65G53/24 ;B65G53/66

DC - P41 Q35

PA - (SATA) SATAKE SEISAKUSHO KK

AP - JP19960287556 19961009

PR - JP19960287556 19961009